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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,935	06/27/2003	Nicholas Grant Rasmussen	300-80100	6976

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EXAMINER
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GUILL, RUSSELL L

ART UNIT	PAPER NUMBER
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2123

DATE MAILED: 09/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/608,935

Applicant(s)

RASMUSSEN ET AL.

Examiner

Russ Guill

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/29/2003, 11/21/2003, 7/5/2006</u>                          | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. Claims 1 - 4 have been examined. Claims 1 - 4 have been rejected.

#### ***Information Disclosure Statement***

2. Cover pages for an Information Disclosure Statement (IDS) dated July 3, 2006 were received, but apparently no IDS was attached for scanning into the electronic files. The paper files were searched to confirm that no IDS was available. The Applicant is requested to kindly resubmit the IDS.

#### ***Claim Objections***

3. Claim 2 is objected to because of the following informalities: While the specification discloses a method of simulating the advecting of elements through space, the preamble appears to claim a method of actually moving a physical element through space. Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 101***

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. **Claims 1 - 4** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

a. Regarding **claim 1**, the claim does not appear to produce a useful and tangible result to form the basis of a practical application needed to be statutory. Simulating advecting elements through 3D space does not appear to be a tangible result.

b. Regarding **claims 2 - 3**, the claims do not appear to produce a useful and tangible result to form the basis of a practical application needed to be statutory. Determining element movement information does not appear to be a tangible result.

c. Regarding **claim 4**, the claim does not appear to produce a useful and tangible result to form the basis of a practical application needed to be statutory. Simulating advecting elements through 3D space does not appear to be a tangible result. Please note that an apparatus that does not produce a useful and tangible result is rejected under 35 USC § 101.

d. Regarding **claim 4**, the claim appears to be directed to an arrangement of software being claimed as a set of functional descriptive material per se, and as such, is non-statutory. While the preamble recites an apparatus, the “means for” limitations do not appear to include any means for processing, rather the limitations all appear to be software per se.

### *Claim Rejections - 35 USC § 102*

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 1 and 4** are rejected under 35 U.S.C. 102(b) as being anticipated by Fedkiw (Ronald Fedkiw et al.; "Visual simulation of smoke", 2001, Proceedings of SIGGRAPH 2001, art provided by the Applicant on the IDS dated October 29, 2003).

- a. Regarding **claim 1**:
- b. Fedkiw appears to teach:
- c. generating a plurality of 2D grids, each 2D grid having a plurality of grid points (**page 17, figure 1, left-side illustration of a plurality of intersecting 2D grids**);
- d. associating movement information with each 2D grid point (**page 17, figure 1, right-side illustration displays a velocity on each face of a plurality of intersecting 2D grids**);
- e. changing the movement information associated with the 2D grid points over a time period that includes a series of time steps (**page 17, section 4 Implementation, right-side column, third paragraph that starts with "Our solver requires ..."**);
- f. defining a region of 3D space using the 2D grids (**page 17, figure 1, left-side illustration**);
- g. advecting the plurality of elements through the region of 3D space using the movement information associated with the 2D grids (**page 15, section 1.2 Our Model, first paragraph**).
- h. Regarding **claim 4**:
- i. Fedkiw appears to teach:

- j. Means for generating a plurality of 2D grids, each 2D grid having a plurality of grid points (**page 17, figure 1, left-side illustration of a plurality of intersecting 2D grids**);
- k. Means for associating movement information with each 2D grid point (**page 17, figure 1, right-side illustration displays a velocity on each face of a plurality of intersecting 2D grids**);
- l. Means for changing the movement information associated with the 2D grid points over a time period that includes a series of time steps (**page 17, section 4 Implementation, right-side column, third paragraph that starts with "Our solver requires . . ."**);
- m. Means for defining a region of 3D space using the 2D grids (**page 17, figure 1, left-side illustration**);
- n. Means for advecting the plurality of elements through the region of 3D space using the movement information associated with the 2D grids (**page 15, section 1.2 Our Model, first paragraph**).

*Claim Rejections - 35 USC § 103*

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. **Claims 2 - 3** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fedkiw (Ronald Fedkiw et al.; "Visual simulation of smoke", 2001, Proceedings of SIGGRAPH 2001, art provided by the Applicant on the IDS dated October 29, 2003) in view of Wyvill (Brian Wyvill et al.; "Animating soft objects", 1986, The Visual Computer, Volume 2, pages 235 - 242, art provided by the Applicant on the IDS dated November 21, 2003).

a. Regarding **claim 2**:

b. Fedkiw appears to teach:

- i. generating a plurality of 2D grids, each 2D grid having a plurality of grid points, each grid point having movement information (**page 17, figure 1, left-side illustration displays a plurality of intersecting 2D grids, right-side illustration displays a velocity on each face of a plurality of intersecting 2D grids**);
- ii. defining a region of 3D space using the 2D grids (**page 17, figure 1, left-side illustration**);
- iii. generating a plurality of elements in the region of 3D space, each element having a location (**page 17, figure 1, left-side illustration; it**

would have been obvious that the cube of 3D space was divided into elements); and

iv. for each element, determining movement information for an element based on the location of the element in the region of 3D space (page 17, figure 1, right-side illustration displays a velocity on each face of the element), the determining step including:

(1) identifying points on the 2D grids that lie on both sides of the element at the location in the region of 3D space (page 17, figure 1, right-side illustration displays a velocity on each face of the element);

(2) determining movement information at the points on the 2D grids (page 17, figure 1, right-side illustration displays a velocity on each face of the element);

c. Fedkiw does not specifically teach:

i. interpolating between the movement information at the points on the 2D grids to determine element movement information for the element at the location in 3D space.

d. Wyvill appears to teach:

i. interpolating between the movement information at the points on the 2D grids to determine element movement information for the element at the location in 3D space (page 237, section "Keyframe interpolation").

e. The motivation to use the art of Wyvill with the art of Fedkiw would have been the benefit recited in Wyvill that various complex motions can be defined



without introducing complications inherent in other methods (**page 241, section "Conclusion and future work"**).

f. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Wyvill with the art of Fedkiw to produce the claimed invention.

g. Regarding **claim 3**:

h. Fedkiw appears to teach:

i. the movement information includes a 2D vector (**page 17, figure 1, right-side illustration displays a velocity on each face of the element**).

**11. Examiner's Note:** Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the Applicant in preparing responses, to fully consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

*Conclusion*


12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russ Guill whose telephone number is 571-272-7955. The examiner can normally be reached on Monday - Friday 9:30 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Any inquiry of a general nature or relating to the status of this application should be directed to the TC2100 Group Receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RG

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Examiner  
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9/14/00